

We Claim

1. An integrated circuit device which comprises  
5 a substrate;  
drive circuitry arranged on the substrate; and  
a plurality of micro-electromechanical devices positioned on the substrate, each  
device comprising:  
10 an elongate actuator having a fixed end that is fast with the substrate so that  
the actuator is connected to the drive circuitry and a free end that is displaceable  
along a path relative to the substrate to perform work, the actuator including a pair  
of elongate arms that are spaced relative to each other along the path and are  
connected to each other at each end, with one of the arms being connected to the  
drive circuitry to define a heating circuit and being of a material that is capable of  
15 expansion when heated, such that, when the heating circuit receives an electrical  
signal from the drive circuitry, that arm expands relative to the other to deform the  
actuator and thus displace said free end along said path.
2. An integrated circuit device as claimed in claim 1, in which each micro-  
20 electromechanical device includes a fluid ejection member positioned on the free end of the  
actuator, the integrated circuit device including a plurality of fluid chambers positioned on  
the substrate, with the substrate defining fluid flow paths that communicate with the fluid  
chambers, each fluid ejection member being positioned in a respective fluid chamber to  
eject fluid from the fluid chamber on displacement of the actuator.  
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3. An integrated circuit device as claimed in claim 2, in which a sidewall and a roof  
wall define each fluid chamber, the roof wall defining an ejection port, with the fluid  
ejection member being displaceable towards and away from the ejection port to eject fluid  
from the ejection port.
4. An integrated circuit device as claimed in claim 3, in which each fluid ejection  
30 member is in the form of a paddle member that spans a region between the respective fluid

chamber and the respective fluid flow path so that, when the heating circuit receives a signal from the drive circuitry, the paddle member is driven towards the fluid ejection port and fluid is drawn into the respective fluid chamber.

5. An integrated circuit device as claimed in claim 4, in which each paddle member has a projecting formation positioned on a periphery of the paddle member, the formation projecting towards the ejection port so that the efficacy of the paddle member can be maintained while inhibiting contact between the paddle member and a meniscus forming across the ejection port.

10 6. An integrated circuit device as claimed in claim 1, in which each actuator includes a heat sink that is positioned on the arm that defines the heating circuit, intermediate ends of that arm, to provide generally uniform heating along the length of the arm.

15 7. An integrated circuit device as claimed in claim 1, in which each actuator includes at least one strut that is fast with each arm at a position intermediate ends of the arms.